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Quarterly Development Report
DEVELOPMENT OF -
FILM DIELECTRIC CAPACITORS --- HIGH TEMPERATURE

-0-

This report covers the period June 15, 1953 to September 30th, 1953

TOBE DEUTSCHMANN CORPORATION

921 Providence Highway
Norwood, Massachusetts

NAVY DEPARTMENT BUREAU OF SHIPS --- ELECTRONICS DIVISION

Classification cancelled in accordance with
Executive Order 10501 issued 5 November 1953

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~~R-E-S-T-R-I-C-T-E-D~~ABSTRACTPHASE I

Probably one of the more important characteristics of Mylar with regard to its use as a dielectric is most often overlooked or at best treated very insignificantly by research organizations. In their anxiety to point out its superior electrical and temperature qualities they overlook a fact on which a production or methods department undoubtedly would consider its most important attribute. The more one works with Mylar the more one realizes the comparative ease with which Mylar capacitors are made. All the units made thus far for this particular project have gone through two departments only - namely, winding and assembly. In comparison, a paper wound capacitor of similar construction must go through a minimum of one more department, namely, impregnation. This in itself is quite a process, requiring a day or days of heat and vacuum and the resultant labor of loading and unloading ovens. Furthermore, the cost of maintaining this heat and vacuum is a very significant portion of the total cost of the unit.

It might be found later as work progresses with Mylar units that even they should be impregnated for best results. At this point this is mere speculation. However, it is a fact that an unimpregnated Mylar unit will surpass an impregnated paper unit of the same construction in overall electrical tests.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

~~R-E-S-T-R-I-C-T-E-D~~

R-E-S-T-R-I-C-T-E-D

Part I.

ABSTRACTPHASE II

The greatest difficulty encountered with Metallized Mylar to date has been one of assembly. The number of complete breakdowns in any given test, even though the applied voltage approaches the stress point of the film, is usually less than ten per cent. Unfortunately, for test purposes, before the complete rupture point of the dielectric is reached the unit "opens", i. e., one or both of the terminals become isolated from the section. The rate at which these "opens" occur, of course, depends upon the voltage applied during the test. The higher the voltage stress - the greater the number of opens. This phenomenon is natural, however, since the current density is greatest at the edges of the film, thereby causing the greatest concentration of breakdowns in these areas. The higher the voltage, the more frequent the breakdowns, the greater the possibility of opens occurring. Probably the foremost measure to correct this situation is to apply a denser film of metal to the Mylar. With the material on hand being as it is, the work in this phase will continue to use both total or complete breakdowns and opens as a means of determining the result of each test.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

Part I.PURPOSE

A. Develop Film Dielectric Capacitors, high-temperature, utilizing DuPont "Mylar" Film (V-200) or equivalent, as a capacitor dielectric, in order to achieve higher temperature operation and greater reliability of fixed paper capacitors, in accordance with Bureau of Ships Contract Specification SHIPS F-400, dated 15 September 1951, as follows:

B. Phase I.

1. Evaluate a V-200 film or equivalent in accordance with paragraph 3.2.1 of referenced Bureau of Ships Contract Specification SHIPS F-498.
2. Furnish fifty (50) each of various capacitors as described in paragraph 3.2.1 of referenced Bureau of Ships Contract Specification SHIPS F-498.
3. Submit reports as specified therein.

C. Phase II.

1. Evaluate a V-200 film or equivalent with metallized electrodes in accordance with paragraph 3.2.2 of referenced Bureau of Ships Contract Specification SHIPS F-499.
2. Furnish fifty (50) each of various capacitors as described in paragraph 3.2.1 of referenced Bureau of Ships Contract Specification SHIPS F-499.
3. Furnish one (1) set of Type D. Class IV Manufacturing Drawings in accordance with Bureau of Ships Specification 16D19 (RE), dated 15 January 1946, and Amendment No. 2 dated 1 May 1948.
4. Submit reports as specified herein.

GENERAL FACTUAL DATAPhase I.

The Mylar received for this project has come to us in three shipments. The first, consisted of a few rolls of .0005" with which the introductory samples were made. The second and third, completed our order of .00025" and .0005" film. Before this quarter all the material used came from the second shipment. However, now there is very little low gauged material left and it has become necessary to use some of the third shipment.

In the construction of this 1 Mfd. unit comprising two .00025" and one .0005" film between foils, considerable manipulation of the rolls was needed to maintain a total thickness of the three layers not to exceed .00112". In some instances rolls as high as .00029" for .00025" and .00059" for .0005" were used.

Test groups NObsr #91 through #104 (See Part III pp. 1-6) had more mechanical failures than are ordinarily found. Examination of these sections revealed that in every instance the failure occurred at the margin. Moreover, the margins of these units were out of alignment. During the winding operation the films tended to sway and went unobserved by the operator. In some cases the margins varied as much as 3/32". These units were representative of many wound at the same time (group NObsr #93 through #104 See Part III p. 25) but were tested at voltages of 1600 V.D.C. or greater. Undoubtedly, units in groups tested with lower voltages had this same margin sway, but did not fail because the test voltage was insufficient to cause corona.

R-E-S-T-R-I-C-T-E-D

GENERAL FACTUAL DATA (Continued)

Test groups NObsr #118 through #122 (See Part III p. 25) had more voltage breakdowns before life test than is usual. Examination of the sections revealed them to be mechanical faults. The solder seam between the cover and the can falls approximately upon the top margin of the section. In these units that protective margin had been fused away by the excessive heat of soldering. Ordinarily the units are soldered with an electrically heated soldering iron, but these were torched by error. In the cases of these failures the excessive heat of the torch was held in one position too long allowing the Mylar to fuse and crack.

GENERAL FACTUAL DATAPHASE II

The tests inducted with Metallized Mylar prior to this quarter yielded information more so than conclusive results. In many instances "opens" occurred during the life tests that could not be correlated with any specific time of said life test. To correct this situation it was our plan to incorporate into the life test circuit a means for measuring the total capacitance of the units on test. In that manner a regular check would reveal the loss of a unit or units, and the time of that loss could be closely established. However, after a thorough investigation such a circuit was found to be too intricate to employ for this purpose - particularly since it is usual to have six different life tests operating on six different life test circuits at the same time. As an alternative, the regular capacitance measurements were made with a portable, variable, 60 cycle, capacitance bridge. The process is manual. The technician cuts the voltage from the units to be tested and allows them to discharge before making connections with the bridge. The more frequent the number of temporary breakdowns, the more often the capacitance must be measured.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATAPHASE I

Work was resumed according to the plan outlined in the June, 1953 quarterly report. The capacitor construction involved being the 1 Mfd. unit constructed with two .00025" Mylar films and one .0005" Mylar film between foils. The total thickness of the three layers of Mylar between foils varies between .00106" and .00112". The margin is 1/4". All life tests were run at 85°C.

A. Seventy-five units divided into three groups of twenty-five each:

1. Tested at 1600 V.D.C., one unit failed voltage test prior to Life Test. It was a Mylar failure. The remaining twenty-four units were placed on Life Test, and seventeen completed 83 hours. There were four mechanical failures, two Mylar failures, and one opened during the test. (See Part III P. 1.)
2. Tested at 1700 V.D.C., four units failed voltage test prior to Life Test. Two were Mylar failures and two were mechanical failures. The remaining twenty-one units were placed on Life Test, and sixteen completed 72 hours. There were three Mylar and two mechanical failures. (See Part III P. 2.)
3. Tested at 1800 V.D.C., two units failed voltage test prior to Life Test. Both were mechanical failures. The remaining twenty-three units were placed on Life Test and fifteen completed 76 hours. There were five Mylar and three mechanical failures. (See Part III P. 3.)

B. Seventy-five units divided into three groups of twenty-five each:

1. Tested at 1900 V.D.C., two units failed voltage test prior to life test. Both were Mylar failures. The remaining twenty-three units were placed on Life Test, and seventeen completed 72 hours. There were three Mylar and three mechanical failures. (See Part III P. 4.)

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATA Phase I (continued)

2. Tested at 2000 V.D.C., four units failed voltage test prior to Life Test. Two were Mylar and two mechanical failures. The remaining twenty-one were placed on Life Test and fifteen completed 90 hours. There were five Mylar and one mechanical failure. (See Part III P. 5.)

3. Tested at 2100 V.D.C., two units failed voltage test prior to Life Test. Both were Mylar failures. The remaining twenty-three were placed on Life Test and sixteen completed 72 hours. There were three Mylar, three mechanical failures and one unit opened during the test. (See Part III P. 6.)

C. Seventy-five units divided into three groups of twenty-five each:

1. Tested at 2000 V.D.C., two units failed voltage test prior to Life Test. Both were Mylar failures. The remaining twenty-three units were placed on Life Test and seventeen completed 72 hours. There were six Mylar failures. (See Part III P. 7.)

2. Tested at 2100 V.D.C., two units failed voltage test prior to Life Test. Both were Mylar failures. The remaining twenty-three units were placed on Life Test and eighteen completed 76 hours. There were four Mylar and one mechanical failure. (See Part III P. 8.)

3. Tested at 2200 V.D.C., two units failed voltage test prior to Life Test. One was a Mylar failure and the other mechanical. The remaining twenty-three units were placed on Life Test and fourteen completed 85 hours. There were six Mylar and two mechanical failures and one unit opened during the test. (See Part III P. 9.)

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATA Phase I (continued)

D. Seventy-five units divided into three groups of twenty-five each:

1. Tested at 2200 V. D. C., two units failed voltage test prior to Life Test. One was a Mylar and the other a mechanical failure. The remaining twenty-three units were placed on Life Test and seventeen completed 72 hours. There were four Mylar and one mechanical failure. One unit opened during the test. (See Part III P. 10.)
2. Tested at 2300 V. D. C., one unit failed voltage test prior to Life Test because of mechanical faults. The remaining twenty-four units were placed on Life Test and sixteen completed 79 hours. There were four Mylar and two mechanical failures. Two units opened during the test. (See Part III P. 11.)
3. Tested at 2400 V. D. C., all units passed tests prior to Life Test and were placed on Life Test - sixteen completing 72 hours. There were eight Mylar failures. One unit opened during the test. (See Part III P. 12.)

E. Seventy-five units were divided into three groups of twenty-five each:

1. Tested at 2300 V. D. C., all units passed tests prior to Life Test and were placed on Life Test - five units completing 72 hours. There were nineteen Mylar failures. One unit opened during the tests. (See Part III P. 13.)
2. Tested at 2400 V. D. C., all units passed tests prior to Life Test and were placed on Life Test - twelve units completing 72 hours. There were ten Mylar failures. Three units opened during the test. (See Part III P. 14.)

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATA Phase I (continued)

3. Tested at 2500 V. D. C., all units passed tests prior to Life Test and were placed on Life Test -- sixteen units completing 80 hours. There were eight Mylar failures. One unit opened during the test. (See Part III P. 15.)

F. Seventy-five units were divided into three groups of twenty-five each:

1. Tested at 2300 V. D. C., one unit failed voltage test prior to Life Test. By error the wrong unit was first opened thereby reducing the number started on Life Test to twenty-three. Fourteen units completed 74 hours. There were eight Mylar failures and one unit opened during the test. (See Part III P. 16.)
2. Tested at 2400 V. D. C., one unit failed voltage test prior to Life Test. It was a Mylar failure. The remaining twenty-four units were placed on test and twelve completed 84 hours. There were nine Mylar failures and three units opened during the test. (See Part III P. 17.)
3. Tested at 2500 V. D. C., one unit failed voltage test prior to Life Test because of mechanical faults. The remaining twenty-four were placed on test and nine completed 72 hours. There were twelve Mylar failures and one opened during the test. (See Part III P. 18.)

G. Seventy-five units were divided into three groups of twenty-five each:

1. Tested at 2100 V. D. C., all units passed tests prior to Life Test and all were placed on Life Test -- eight completing 78 hours. There were sixteen Mylar failures and one unit opened during the test. (See Part III P. 19.)

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATA Phase 1 (continued)

2. Tested at 2200 V.D.C., one unit failed voltage test prior to Life Test because of mechanical faults. The remaining twenty-four units were placed on Life Test and fourteen completed 76 hours. There were seven Mylar and three mechanical failures. (See Part III P. 20.)
 3. Tested at 2300 V.D.C., six units failed voltage test prior to Life Test. All were mechanical failures. The remaining nineteen units were placed on Life Test and twelve completed 72 hours. There were five Mylar failures and two units opened during the test. (See Part III P. 21.)
- H. Seventy-five units were divided into three groups of twenty-five each:
1. Tested at 2000 V.D.C., seven units failed voltage test prior to Life Test because of mechanical faults. The remaining eighteen units were placed on Life Test and twelve completed 79 hours. There was one mechanical failure and five Mylar failures. (See Part III P. 22.)
 2. Tested at 2100 V.D.C., five units failed voltage test prior to Life Test. There was one Mylar and four mechanical failures. The remaining twenty units were placed on Life Test and fifteen completed 72 hours. There was one mechanical and four Mylar failures. (See Part III P. 23.)
 3. Tested at 2200 V.D.C., two units failed voltage test prior to Life Test. Both were mechanical failures. The remaining twenty-three units were placed on Life Test and eighteen completed 72 hours. There were four Mylar failures and one unit opened during the test. (See Part IV P. 24.)

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATAPHASE II

All the work done this last period with Metallized Mylar capacitors was concentrated on the .25 Mfd. type with single .0005" film construction.

All Life Tests were conducted at 85°C.

A. Seventy-five units divided into three groups of twenty-five each:

1. Tested at 600 V.D.C., all units passed tests prior to Life Test. All twenty-five units were placed on Life Test and twenty-two completed 286 hours. Three units opened during the test. (See Part III pp. 26, 27, 28.)
2. Tested at 700 V.D.C., two units opened prior to Life Test. The remaining twenty-three units were placed on Life Test and twenty-one completed 285 hours. Two units opened during the test. (See Part III pp. 29, 30, 31.)
3. Tested at 800 V.D.C., all units passed the tests prior to Life Test. All twenty-five units were placed on Life test and twenty-three completed 285 hours. Two units opened during the test. (See Part III pp. 32, 33, 34.)

B. Seventy-five units were divided into three groups of twenty-five each:

1. Tested at 900 V.D.C., six units failed the tests prior to Life Test. Two were voltage failures and four were opens. The remaining nineteen units were placed on Life Test and seventeen completed 262 hours. Two units opened during the Test. (See Part III pp. 35, 36, 37.)

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATA Phase II (continued)

2. Tested at 1000 V. D. C., five units failed the tests prior to Life Test. Three were voltage failures and two were opens. The remaining twenty units were placed on Life Test and Thirteen completed 263 hours. One unit failed completely during voltage pre-breakdown test and six units opened during the test. (See Part III pp. 38, 39, 40.)
 3. Tested at 1100 V. D. C., six units failed the tests prior to Life Test. Four were voltage failures and two were opens. The remaining nineteen units were placed on Life Test and eleven completed 260 hours. One was a complete breakdown, and seven opened during the test. (See Part III pp. 41, 42, 43.)
- C. Seventy-five units were divided into three groups of twenty-five each:
1. Tested at 1200 V. D. C., five units failed the tests prior to Life Test. Two were opens and three failed voltage during the pre-breakdown period. The remaining twenty units were placed on Life Test and ten completed 256 hours. Ten units opened during the test. (See Part III pp. 44, 45, 46.)
 2. Tested at 1300 V. D. C., seven units failed the tests prior to Life Test. Five were opens and two failed completely during the pre-breakdown period. The remaining eighteen units were placed on Life Test and one completed 252 hours. Three units failed completely and fourteen units opened during the test. (See Part III pp. 47, 48, 49.)

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

DETAIL FACTUAL DATA Phase II (continued)

3. Tested at 1400 V.D.C., three units failed the tests prior to Life Tests. One unit failed completely and two opened. The remaining twenty-two units were placed on Life Test and two completed 252 hours. Two units failed during the pre-break-down test, three failed completely during Life Test and fifteen opened. (See Part III pp. 50, 51, 52.)
- D. Seventy-five units were divided into three groups of twenty-five each:
1. Tested at 800 V.D.C., six units opened prior to Life Test. The remaining nineteen units were placed on Life Test and all passed 255 hours. (See Part III pp. 53, 54, 55.)
 2. Tested at 900 V.D.C., four units failed the tests prior to Life Test. Three units opened and one failed completely. The remaining twenty-one units were placed on test and eighteen completed 252 hours. Three units opened during the test. (See Part III pp. 56, 57, 58.)
 3. Tested at 1000 V.D.C., two units opened prior to Life Test. The remaining twenty-three were placed on Life Test and thirteen completed 250 hours. Two units failed completely and eight opened during the test. (See Part III pp. 59, 60, 61.)

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

CONCLUSIONSPHASE I

The 1 Mfd. unit constructed with two layers of .00025" and one layer of .0005" Mylar between foils:

It became noticeable as the test voltage was increased with this type of unit that the method of attaching the tab to the terminal was not satisfactory at high stresses. (See Table I Part III P. 25.) A considerable number of units opened some time during the Life Test. In every case the open occurred at the point where the tab was spot welded to the terminal stud. A single spot weld at this junction has been used throughout this project. Apparently the bonded area provided by this single weld is insufficient to carry the high instantaneous current surge that occurs when the entire bank of capacitors discharge through a short circuited unit. In the future, units of this type construction will be spot welded at two or three points.

The accompanying table is an average of the individual tests conducted at the same test voltages.

Temperature	Voltage D. C.	Percent Mylar Failures	Number of Units Tested
85° C	2000	27%	62
85° C	2100	30%	91
85° C	2200	25%	93
85° C	2300	41%	91
85° C	2400	40%	74
85° C	2500	45%	49

R-E-S-T-R-I-C-T-E-D

CONCLUSIONS PHASE I (continued)

Throughout this project the method used to determine the per cent of Mylar failures will be the same. Any or all mechanical failures and opens that occur during the Life Test will be subtracted from the total started on test. In this manner a better control may be maintained over errors of winding or assembly.

Because the Mylar used gauges heavier than that specified, it is only natural that the voltage stresses achieved are somewhat higher than expected. The Mylar gauges inconsistently and likewise the voltage stresses are found to be erratic. However, when the averages of the individual test voltage groups are computed, the results indicate that a unit constructed with two layers of .00025" and one layer of .0005" Mylar between foils can be Life Tested at 85° C at a potential not to exceed 2000 V. D. C. for a period of seventy-two hours with no greater than thirty per cent loss of units.

CONCLUSIONSPHASE II

The figures listed in the table (Page 16) are averages derived from all the individual life tests with the .25 Mfd. unit constructed with a single film of .0005" Metallized Mylar. (See Part III P. 62 and Quarterly Report June 30, 1953 P. 26.)

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N R-E-S-T-R-I-C-T-E-D

R-E-S-T-R-I-C-T-E-D

CONCLUSIONS PHASE II (continued)

Test Voltage	Permanent Failures	Opens After Life Test	Number of Temporary Breakdowns/ Microfarad / 250 hours
600 V.D.C	0%	6.5%	12.8
700 "	1.3%	6.5%	33.6
800 "	1.0%	10.8%	23.6
900 "	0%	9.2%	65.2
1000 "	10%	39%	190.4
1100 "	2%	38%	168
1200 "	26%	36%	121.2
1300 "	12%	56%	456.8
1400 "	34%	32%	276.8

To calculate the number of temporary breakdowns per microfarad the following procedure was used:

The number of units used in each test was found by averaging the number of units that started the test and the number that finished. These averages were totalled for each voltage group. The total number of temporary breakdowns for each voltage group was divided by the total number of units used, and this quotient multiplied by four so the result would be expressed in terms of breakdowns per microfarad.

An analysis of this table reveals that the results are not conclusive but are indicative. It would appear that a unit of this type could be life tested at 700 V.D.C. at 85°C and conform to most of the specifications used today, since they usually allow two life test failures during a period of 250 hours.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

PART

II

PROGRAM FOR NEXT INTERVAL

R-E-S-T-R-I-C-T-E-D

PART II

PROGRAM FOR NEXT INTERVAL

PHASE I

With this quarter's work completed we have finished our research with the 1 mfd type capacitor at 85°C. Three different types of construction have been made and tested until the voltage stress limit for each type was established.

Originally, it was our plan to proceed with the .25 mfd type capacitor, and to repeat the program using the three different types of construction with this unit.

However, since one of the more important characteristics of Myler appears to be its resistance to elevated temperatures, and furthermore, the electronic industry has a vital need for capacitors which will operate at high temperatures, we propose to repeat our program with the same unit at 125°C.

The 1 mfd unit constructed with two layers of .0005" between foils will be the first type investigated.

PHASE II

The data compiled with the .25 mfd unit constructed with a single film of .0005" Metallized Myler is sufficient to permit a comparison of performances of this unit at 85°C and at 125°C. Consequently, during the next quarter, we will make more of this type unit and repeat the test pattern, but at the elevated temperature of 125°C.

S-E-C-U-R-I-T-Y I-N-F-O-R-M-A-T-I-O-N

R-E-S-T-R-I-C-T-E-D

LIVE TEST RECORD

25 UNITS
1.0 Mfd - 2X. 25-1X. 5V

Mylor Capacitors

LOT NO. Nob5r 99

SPECIFICATION

FOR WHOM V. Winroth

CONTRACT NO. *N065r* 57200

HOURS ON TEST 72

TEMPERATURE 85.2

VOLTAGE 1600 VDC

Part 3 of 3

Clock #	Date finished
7 -	1371

Clock # 7- 1454

1951
H
PARTIAL LIST

12 July 1053

Total Hours 83

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFE TESTS

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shuttl. Mgrn. - 75% L. ...					100K		100K				100K						100K			100K		100K			
Cap. in mhd. 1000 %	97.5	98.4	98.4	98.1	95.7		99.4	97.6	99.3	96.0	95.7				96.5		92.1			98.7	95.7	98.5			
Power Factor, %	75	54	41	45	43		44	43	43	44	42				53		43			42	49	43			

Page I

92 I
ENGINEERING DEPT. C.L. 1002

Data collected
TOBI DEUTSCHMANN CORPORATION

Data collected by HJ VW. HT.

DORWOOD, WASS

LIFE TEST RECORD

25 UNITS 1.0 Mfd - 2x.25 - 1x.5 U Mylar Capacitors LOT NO. N065R. 100
 SPECIFICATION FOR VERN V. Winroth CONTRACT NO. N065R 59200

HOURS ON TEST 72⁺ TEMPERATURE 85° C VOLTAGE 1700 VDC
 Date started Clock # 8 - 1505 Date finished Clock # 8 - 1577 Total Hours 72
 6 July 1953 10 July 1953

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1700V		Pk							P		P	P		P			P		Pk					P	
Shunt R - Mega-ohms	100K	100K	100K	100K	100K	100K	90K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Capacitance - 1000%	964	969	965	965	949	969	960	999	942	960	1.011			.989	.966	956	977		.995	.967	938	1.009	931	963	963
Power Factor - %	35.5	43	35.5	78	315	365	35	40		36	415			.40	45	39	415		39	235	40	35	325	45	35
Life Test Failures in Hrs.							4				11			9						71		1			

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R - Mega-ohms	100K					100K		100K	100K		100K				100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Capacitance - 1000%	972	967	966	950	976			1.00	960		962				969	963	964		995	969	938	1.009	931	963	963
Power Factor - %	41	42	43	46	46			46	44		44				42	43	44		42	42	40	43	45	46	43
Life Test Failures in Hrs.																									

Data collected by H.J. V.W. H.T.

LIFE TEST RECORD

25 UNITS 1.0 ufd. - 2 X 25 - 1 X 5 U Mylar Capacitors LOT NO. Nbsr 101
 SPECIFICATION FOR WHOM V. Winroth CONTRACT NO. Nbsr 57200

HOURS ON TEST 72^T TEMPERATURE 85°C VOLTAGE 1800 VDC
 Date started Clock # 9-1270 Date finished Clock # 9-1346 Total Hours 76
 6 July 1953 14 July 1953

ELECTRICAL TESTS BEFORE LIFE TEST																									
Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1800V	P	P	P	P			P																	P	
Shunt Meters - 1600V																									
Capacitor - 1000V	972	993	988	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989
Power Factor - %	47	47	46	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
LIFE TEST FAILURES IN HRS.	3			14				30						16	15							58			12

ELECTRICAL TESTS AFTER LIFE TEST																									
Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt Meters - 1600V	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in 45d - 1000V	978	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989
Power Factor - %	47	47	46	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	Mylar Failure Outside 1/4 of the Morning	Mylar Failure Outside 1/4 of the Morning	Mylar Failure Outside 1/4 of the Morning	Mechanical Failure: Bad winding - first few turns. 1" from Morning			Mechanical Failure: First 1/4 of the Morning	Mechanical Failure: First 1/4 of the Morning										Mylar Failure: outside turns. 3/4" from the Morning	952	964	965	Mylar Failure: inner 1/4 of the section - 3/8" from the Morning	966	986	989

LIFE TEST RECORD

23 UNITS 10 ytd. - 2 X 25 - 1 X 5 MIL Mylar Capacitors LOT NO. N665r 102
 SPECIFICATION FOR WHOM V. Winzoth CONTRACT NO. N665r 57200
 HOURS ON TEST 72 TEMPERATURE 85° C VOLTAGE 1900 VDC
 Date started Clock # 7-1455 Date finished Clock # 7-1527 Total Hours 32
 23 July 1953 30 July 1953

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1900V	PK	PK				PK	PK	PK	PK	PK							PK	PK	PK					PK	PK
Shunt, Magn. - 500K							100K	100K	100K								100K	100K	100K					100K	100K
Cap. in ufd. - 1000	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99	987.99
Power Factor - %	31	31	31	34	38	35	35	35	37	30	30	36	35	32	30	38	39	38	38	33	37	31	35	37	33
LIFE TEST FAILURES IN HRS.				1		1	1			42									3						6

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Magn. - 500K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K	10K
Cap. in ufd. - 1000	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99	988.99
Power Factor - %	32	32	35	40	40	40	40	40	39	39	38	40	37	40	38	41	37	37	37	41	38	40	33	39	39
Notes																									

LIFE TEST RECORD

25 UNITS	1.0 yfd.	2 x 25 - 1 x 5 MIL	Mylar Capacitors	LOT NO. Nabst 103
SPECIFICATION		FOR WHOM	V. Winroth	CONTRACT NO. Nabst 57240

HOURS ON TEST	72 ^r	TEMPERATURE	85°C	VOLTAGE	2000 VDC
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Date started	Clock #	8 -	1577	Date finished	Clock #	8 -	1667	Total Hours
	Tray #				Tray #			
10 - 11 - 1952				30 - 11 - 1952				90

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFE TEST

[illegible]

LIFE TEST RECORD

25 UNITS 1.0 MFD - 2X.25 - 1X.5 MIL Mylar Capacitors LOT NO. Nebst 104
 SPECIFICATION FOR VEM V. Winroth CONTRACT NO. Nebst 57200

HOURS ON TEST 72 + TEMPERATURE 85° C VOLTAGE 2100 VDC
 Date started Clock # 9-1346 Date finished Clock # 9-1418 Total Hours 82
 23 July 1953 4 August 1953

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2100V	P	P				P	P	P	P				P	P	P									P	P
Shunt R Megohms	70K	100K	100K	70K	100K	75K	15K	75K	75K	90K	90K	75K	90K	90K	75K	75K	75K	75K	90K	75K	75K	90K	100K	100K	100K
on 105V meter																									
Capacitance Mfd - 1020	961	941	1.011	925	976	1.001	994		971	980	969	989	986	972	983	975	987	979	976	959	986	975	948	1.002	
Power Factor - %	30	31	37	32	32	35	35		35	43	31	30	35	31	32	32	315	31	31	31	31	31	33	315	

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R Megohm 75K	75K	90K	60K	60K	75K	75K	75K													100K	100K	100K	90K		
on 105V meter				0.074 MFD								100K	100K	100K		60K	75K	Outside 2	Outside 2	100K	100K	100K			
Cap. in MFD - 1000	970	937	1.008	975	991	989						983	982	916		985	979	Outside 2	Outside 2	978	958	993	976	985	
Power Factor - %	43	42	37	32	33	35						37	33	38		34	36	Outside 2	Outside 2	38	43	39	32	35	
				section. 1/2 " F20					section 1/6 From the margin	Mylar failure. Inside 1/4 of section	of the margin. Mylar margins outside							Mylar failure. Outside 1/4 of section	Mylar failure. Outside 1/4 of section						
				Mylar failure. Inner 1/4 of the						Mylar failure. Middle of the															
															</										

Date collected by HT. VW. HJ.

LIFE TEST RECORD

SUBSITS 1.0 24ed - 2 X 25 - 1 X 5 MIL Mylar Capacitors LOT NO. Nobsr 105
 SPECIFICATION FOR VEH V. Winroth CONTRACT NO. Nobsr 57200

HOURS ON TEST 72
 Date started 28 July 1953 Clock # 10 - 3682 Date finished 3 Aug 1953 Clock # 10 - 3754
 TEMPERATURE 85°C VOLTAGE 2000 VDC Total Hours 72

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2000 V	P	P				P	P		P										P	P	P	P			P
Shunt Mega-ohm	95K	95K	100K	100K	100K	90K	100K	100K	90K	90K	90K	90K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
on 100 V meter																									
Capacitor 44ed - 1000 pF	972	972	972	972	972	953	972		979	944	921	925	995	995	909	915	890	900	908	956		977	914	948	1.00
Power factor %	33	35	38	33	32	34	35		32	34	38	35	37	34	38	39	37	38	39	40		39	37	39	34
LIFE TEST FAILURES IN HRS.	65		11			7																			
																									</

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt P. Mega. ohm	95K	95K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
on 100 v meter																									
Cap. in 44ed - 1000 pF	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972	972
Power Factor. %	33	35	38	33	32	34	35	35	32	34	38	35	37	34	38	39	37	38	39	40	39	37	39	34	
Notes	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	Mylar failure - middle of the film	

LIFE TEST RECORD

25 UNITS 1.0 ufd. - 2X.25 - 1X.5 MIL Mylar Capacitors LOT NO. N65R 106

SPECIFICATION FOR VEH V. Wignath CONTRACT NO. N65R - 52200

HOURS ON TEST 72 TEMPERATURE 85 C VOLTAGE 2100 VDC

Date started 28 July 1953 Clock # 11-1227 Date finished 1 August 1953 Clock # 11-1303 Total Hours 76

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2100V	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Shunt R. Meas. to 100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in ufd. - 1000	926.940	940.909	940.909	940.909	975.954	954.975	1.005	988.988	535.980	989.989	921.964	949.972	969.969	945.923	818.958	920.920	921.997	997.997	997.997	997.997	997.997	997.997	997.997	997.997	997.997
Power Factor - 6/10	39	37	35	38	38	39	36	40	32	37	36	39	40	32	37	37	42	37	32	32	41	32	37	33	33

LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Meas. to 100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in ufd. 1000 μ s	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	943.915	
Power Factor, %	.33	.36	.36	.36	.39	.42	.36	.40	of the margin. Under of	.39	.40	.37	.40	.38	.38	.40	.39	Section. 1/8" from the middle of the film	.36	.44	.34	.40			
									Mechanical Failure. Under of the margin. Under of																

LIFE TEST RECORD

SPECIFICATION: 20 UNITS 1.0 Mfd. 2x.25-1x.5 MYLAR CAPES. TORS LOT NO. Nebel 107
 FOR WHOM V. Winroth CONTRACT NO. Nebel 57200

HOURS ON TEST: 72+ TEMPERATURE: 85°C VOLTAGE: 2200 VDC
 Date started: July 1953 Date finished: Aug 4 1953 Clock # 13-1001 Tray # 13-1026 Total Hours: 85

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage 2200 VDC																									
Shunt R. Measured																									
Cap. in Mfd. 1000																									
Power Factor %																									

LIFE TEST FAILURES IN HRS.

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Measured																									
Cap. in Mfd. 1000																									
Power Factor %																									

LIFE TEST RECORD

25 UNITS 1044fd - 2X.25 - 1X.5 MIL Mylor Capacitors LOT NO. No654 109
 SPECIFICATION FOR WHOM V. Winthrop CONTRACT NO. No654 52200
 HOURS ON TEST 72 TEMPERATURE 85° C VOLTAGE 2300 VDC
 Date started Clock # 11 - 1303 Date finished Clock # 11 - 1322
 12 August 1953 18 August 1953 Total Hours 79

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R Mega. 24F 100K	<					100K	100K	100K																	
Capacitance 100 μ F 907	966	901	950	913	975	975	926	906	916	991	963	973	971	953	954	974	963	949	966	919	962	954	971		
Power Factor .91	.37	.34	.38	.34	.42	.37	.43	.40	.33	.39	.32	.39	.43	.33	.34	.37	.35	.34	.42	.34	.41	.42	.42		
Voltage - 2300DC PK						P	P																		
LIFE TEST FAILURES IN HRS.			18		40		42													57	1				

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R Mega. 80F 100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Capacitance 100 μ F 903	967	903	967	952	952	968	968	916	997	909	982	977	966	966	966	957	957	957	957	957	957	957	957	957	957
Power Factor - %	.32	.38	.39	.39	.39	.39	.49	.49	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44	.44
Notes	Mylar Failure, Under 1/4 of the spot	100. 1/8 " From the Margin	100. 1/8 " From the Margin	Mylar Failure, Under 1/4 of the spot	100. 1/8 " From the Margin	100. 1/8 " From the Margin	Mylar Failure, Under 1/4 of the spot	Mylar Failure, Under 1/4 of the spot	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin	Section 1/8 " From the Margin

LIFE TEST RECORD

25 UNITS 1.0 ufd - 2X.25-1X.5 Mylar Capacitors LOT NO. 10651 110
 SPECIFICATION FOR WHOM V. Winzoth CONTRACT NO. 10651 57200

HOURS ON TEST - 72 TEMPERATURE 85°C VOLTAGE 2400 VDC
 Date started Clock # 13 - 1086 Date finished Clock # 13 - 1158
 11 August 1953 20 August 1953 Total Hours 72

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2400 VDC																									
Shunt R Meg. 99.9K																									
Cap. in ufd 1000	914	914	914	909	916	977	914	977	976	939	912	950	957	953	966	963	978	929	918	957	974	936	956	911	990
Power Factor - %	37	415	34	37	41	39	33	40	32	39	44	36	42	41	34	36	36	41	33	37	35	34	44	36	37
LIFE TEST FAILURES IN HRS.	1	71				4			2			2				50				Open	8				

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R Meg. $\times 10^6$			100K	100K	100K		100K	100K	100K		100K	100K		100K	100K		100K	100K	100K				100K	100K	100K
Cap. in ufd. 1000V			943	908	916		915	989	977		912	954		960	965		974	922	912				960	912	989
Power Factor: %			49	43	34		30	37	47		43	42		38	40		42	41	39				41	38	38
	Mylar failure. Outer 1/4 of section 1/4 from the top.	Mylar failure. Outer 1/4 of section 1/4 from the top.	Section 1/4" from the top.			Mylar Failure. 3/8" from the top.				Mylar Failure. Inner 1/4 of the section.			Mylar Failure. Inner 1/4 of the section.			Mylar Failure. Inner 1/4 of the section.				Mylar Failure. Inner 1/4 of the section.					

LIFE TEST RECORD

25 UNITS 10 ufd - 2 X .25 - 1 X .5 M/L. Mylar Capacitors LOT NO. Nobsr 111
 SPECIFICATION FOR WHOM V. Winroth CONTRACT NO. Nobsr 57200

HOURS ON TEST 72

TEMPERATURE 85° C VOLTAGE 2300 VDC

Date started 21 August 1953 Clock # 10-3826 Date finished 1 September 1953 Clock # 10-3898

Total Hours 72

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2300V PK																									
Shunt R. Megaohms																									
Cap in 4fd-1000's	1.00	994	970	962	967	940	978	933	977	956	970	934	975	907	996	911	985	966	1011	993	970	967	963	961	972
Power Factor %	37	84	48	35	39	39	38	43	40	38	45	38	38	40	40	46	35	38	38	75	35	39	34	39	41
LIFE TEST FAILURES IN HRS.	16	44	11.5	3	5	12																			

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Megaohms	1.00	994	970	962	967	940	978	933	977	956	970	934	975	907	996	911	985	966	1011	993	970	967	963	961	972
Cap in 4fd-1000's	37	84	48	35	39	39	38	43	40	38	45	38	38	40	40	46	35	38	38	75	35	39	34	39	41
Power Factor %																									

Data collected by HJ. V.W. W.T.

LIFE TEST RECORD

25 UNITS 10 Hld - 2X.25 - 1X.5 MLL - Mylar Capacitors LOT NO. 112
 SPECIFICATION FOR WHOM V. Winroth CONTRACT NO. 10651 57200
 HOURS ON TEST 72 TEMPERATURE 85° C VOLTAGE 2400 VDC
 Date started Clock # 11-1382 Date finished Clock # 11-1454 Total Hours 72
 21 August 1953 1 September 1953

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 24000 P <																								> P	
Shunt Mylar 100K																									> 100K
Cap. in MFL 1000	972	972	979	965	961	900	912	977	999	949	955	953	962	960	950	923	957	952	945	960	970	979	952	945	961
Power Factor - %	31	31	31	42	36	34	40	38	36	44	39	37	30	40	39	39	32	33	37	31	37	43	44	42	
LIFE TEST FAILURES IN HRS. 2								9	8"		34		8"		5	2.5		6			5	43	2		

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mylar 100K		100K	100K	100K	100K	100K	100K			100K		100K		100K			100K			100K					100K
Cap in MFL 1000		979	992		972	912	918			911		967		978			942			966					974
Power Factor = %		39	35		30	33	32			30		34		34			33			30					38
	Major failure. Inner 1/3 of the section. 5/8" from the MFL.			Top tab broken away from the terminal at the spot weld.						Major failure. Outer 1/4 of the section. 1/2" from the MFL.			Top tab broken away from the terminal at the spot weld.		Major failure. Inner 1/4 of the section. 3/16" from the MFL.	Major failure. First 12 turns of the section. 1/16" from the MFL.	Major failure. Outer 1/5 of the section. Middle of the film.	Major failure. Outside 1/4 of the section. 1" from the MFL.					Major failure. Inner 1/5 of the section. 3/16" from the MFL.		

LIFE TEST RECORD

25 UNITS 14fd - 2X.25.1X.5 MIL - Mylar Capacitors LOT NO. NABSR # 114
 SPECIFICATION Experimental FOR WHOM V. Winroth CONTRACT NO. NABSR 57200
 HOURS ON TEST 72 + TEMPERATURE 85°C VOLTAGE 2300 VDC
 Date started Clock # 7 - 1518 Date finished Clock # 7 - 1592
 2 September 1953 Tray # 11 September 1953 Total Hours 74

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2300V	P	P							P			P												P	
Shunt R Mfg. S.F. 100K																									
Capacitor mfd. 1000	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935
Power Factor - %	35	37	39	39	39	40	37	37	35			37	39	33	36	35	31	41	43	40	39	34	41	37	41
LIFE TEST FAILURES IN HRS.			4		5	5		2												10		8		32	

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R Mfg. S.F. 100K																									
Capacitor mfd. 1000	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935
Power Factor - %	33	31					30	31	31			36	33	32	30	42		35	2.2		45		38		30
Notes				Top to the isolated terminal broken away at the spot weld	Mylar failure. Inner 1/3 of the section 1/3 from the margin	Mylar failure. Inner 1/3 of the section 1/3 from the margin	Mylar failure. Halfway in the section 1/3 from the margin										Mylar failure. Inner 1/3 of the section. Middle of the film								

LIFE TEST RECORD

25 UNITS 1046d-2X.25-1X.5 MIL - Mylar Capacitors

CONTRACT NO. Nob5r 57200

FOR WHOM V. W

TEMPERATURE 85°C VOLTAGE 2400 VDC

Hours on Test 72

Date started 2 September 1953

Clock # 11-1412

Tray # 11

Date finished 11 September 1953

Tray # 11

Total Hours 84

Electrical Tests Before Life Test

Sample Number

1

2

3

4

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LIFE TEST RECORD

25 UNITS
1.0 ufd. - 2 X .25 1 X .5 M16-Mylor Capacitors

SPECIFICATION *Experimental*

FOR WHOM

TEST NO SHOWS HOURS ON TEST

54

HOURS ON TEST		TEMPERATURE	
Date started	72	Clock #	Date finished
		13 -	1262

Date started	Clock #	13 -	Date finished	Clock #
	Tray			Tray
September 1953			14 September 1953	

2 September 1953

Tray

707

tem

Tray +

100

Total Hours

73

•

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltag = 250000 Pk																				P					P
Shunt R. Mege 21000K																				100K					100K
Cap. in 400. 10000 924 957	954	961	929	928	978	949	936	972	955	923	960	970	930	931	922	951	958			953	958	977	980	955	982
Power Factor %	32	30	32	42	41	33	40	41	41	32	33	39	39	44	40	40	45			39	40	41	40	37	35
LIFE TEST FAILURES IN HRS.	6	11	3.5				6	3						23	2	4	2	5			open				2

ELECTRICAL TESTS AFTER LIFE TEST

[illegible]

Page 18

ENGINEERING DEPT. C.L. 1002

TOUS MÉTIERS EN COOPÉRATION

Data collected by H.T. V.W. H.J.

DORWOOD, MASS

LIFE TEST RECORD

LOT NO. 117

Mylar Capacitors

CONTRACT NO. *Nob5r 57200*

VOLTAGE 2100 VDC.

Date started	Clock # Tray	Date finished	Clock # Tray	Total Hours
11 September 1953	7-1592 Tray	10 September 1953	7-1670	78

Total Hours 78

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2100 DC	P	K																							P
Shunt R. Mg. in F100K																									100K
Cap. in 454-1000K	9.50	9.47	9.70	9.59	9.82	9.63	9.62	9.60	9.50	9.46	9.53	9.70	9.25	9.51	9.58	9.80	9.36	9.59	9.65	9.82	9.77	9.44	9.84	9.82	9.70
Power Factor	0.53	0.70	0.51	0.34	0.42	0.37	0.38	0.46	0.35	0.37	0.40	0.37	0.40	0.38	0.39	0.40	0.39	0.44	0.39	0.44	0.35	0.40	0.42	0.35	0.39
LIFE TEST FAILURES IN HRS.	78	4	20	23	4		8	4.5		1	4		67	8	62	4		14					19	1	

ELECTRICAL TESTS AFTER LIFE TEST

[illegible]

Page 19

NO. 1002 C.L. 1002

TOYS UNFACED COMPANY

Data collected by H.T. V.W.

WATKINS. MASS.

LIFE TEST RECORD

25 UNITS 1.0 yfd. \therefore 2 x .25 = 18.5 MIL - Mylar Copalitors

LOT NO. No 651 118

SPECIFICATION: Experimental

FOR WHOM V. Winroth

CONTRACT NO. *No 65r* 57200

HOURS ON TEST 72⁺

TEMPERATURE 85°C

VOLTAGE 2200 VDC

Date started	Clock #	Date finished
	8 -	1911

Clock # 8 - 1787.

11 September 1953

18 September 1953

Total Hours 76

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 200V	P	<		P	P	P	P																		
Shunt R. Megohm	> 100K	<		> 100K	> 100K	> 100K	> 100K																		
Cap. in mfd. - 1000	905	934	888	942	898	919	892	950	916	929	972	977	951	900	904	906	961	104	961	961	104	979	924	935	971
Power Factor - %	42	45	42	41	43	43	40	45	37	44	44	46	50	47	48	42	46	44	42	46	100	45	48	39	39
LIFE TEST FAILURES IN HRS.					29							1	5					60			.5	6	3		5

ELECTRICAL TESTS AFTER LIFT TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mega-ohm	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in Hfd - 1000 μ	919	929	912																						
Power Factor - %	.40	.50	.32				.32	.45		.48	.48			.48	.56	.48	.46		.39	.49			.52		

Data collected by H.T. VW

LIFE TEST RECORD

25 UNITS 1.0 Mfd. - 2X.25 1X.5 MIL Mylar Capacitors LOT NO. Nobsr 119

SPECIFICATION Experimental FOR VEH V. Winroth CONTRACT NO. Nobsr 57200

HOURS ON TEST 72

TEMPERATURE 85° a

VOLTAGE 2300 VDC

Date started

Clock # 11-1496

Clock # 11-1568

Total Hours 72

11 September 1953

17 September 1953

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 2300DC	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Short R. Megs. - 75 FREQ	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in Mfd. - 1000	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947
Power Factor - %	.46	.37	.35	.42	.42	.47	.42	.41	.47	.47	.47	.50	.48	.45	.51	.51	.51	.37	.42	.42	.48	.47	.44	.40	.47
LIFE TEST FAILURES IN HRS.				9	9					4				5	2			3							

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Short R. Megs. - 75 FREQ	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in Mfd. - 1000	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949
Power Factor - %	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58	.58

Page 21

ENGINEERING DEPT. C.L. 1002

TOBE DEUTSCHMAN CORPORATION

Data collected by H.J. VW.

BORWOOD, MASS

LIFE TEST RECORD

UNITS 144d. 2X.25-1X.5 MIL Mylar Capacitors LOT NO. N6b5r 120
 SPECIFICATION Experimental FOR WHOM V Winloth CONTRACT NO. N6b5r 57200
 HOURS ON TEST 72 VOLTAGE 2000 VDC
 Date started Clock # 8-1788 Date finished Clock # 8-1867 Total Hours 77
 18 September 1953 24 September 1953

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mega-ohm	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in mfd. 1000	2.954	960	914	900	918	937	906	918	961	995	947	881	930	930	937	937	937	937	985	985	985	985	985	985	985
Power Factor	.38	.41	.42	.37	.40	.45	.36	.38	.42	.44	.37	.38	.39	.39	.33	.33	.33	.33	.35	.35	.35	.35	.35	.35	.35
Voltage - 2000 PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK	PK
LIFE TEST FAILURES IN HRS.	8				17	8.5	Unable to locate failure	Unable to locate failure		33															

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mega-ohm	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in mfd. 1000	959	928	928	907	918	912	912	923	963	963	959	903	945	945	945	945	945	945	945	945	945	945	945	945	945
Power Factor %	.35	.35	.35	.49	.49	.44	.44	.45	.42	.42	.49	.37	.35	.35	.35	.35	.35	.35	.35	.35	.35	.35	.35	.35	.35
Notes	Mylar failure. Inner 1/5" from the margin.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	Mylar failure. Outer 1/4" from the margin. Middle of the failure.	

LIFE TEST RECORD

UNITS 1.4fd - 2X.25 - 1X.5 MIL Mylar Capacitors LOT NO. Nabser 121
 SPECIFICATION Experimental FOR WHOM V. Winroth CONTRACT NO. Nabser 57200
 HOURS ON TEST 72 TEMPERATURE 95°C VOLTAGE 2100 VDC
 Date started 11-15-68 Clock # 11-1640 Total Hours 72
 18 September 1953 23 September 1953 Tray #

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Voltage - 1000V	P								P		P												P
Shunt R Megs. 100K																							
Cap. in 4fd. 1000V	959	954	943	932	931	935			936		923	899	935	889	889	940	923	994	711	908	963	953	949
Power Factor - %	36	35	41	33	32	42			33		44	42	37	41	39	44	46	38	35	36	44	43	41
LIFE TEST FAILURES IN HRS.	9			20							1								2		1		

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R Megs. 100K																									
Cap. in 4fd. 1000V	997	997	957		945	954			944			944	893	942	842	988	931	993	922						
Power Factor - %	37	39			45	52			53			35	50	35	48	47	47	51	40						
LIFE TEST FAILURES IN HRS.																									

LIFE TEST RECORD

UNITS	SPECIFICATION	FOR WHICH	CONTRACT
25	4fd - 2x.25-1x.5 MIL	Mylar Capacitors	
		Experimental	
		Winch	

LOT NO. Nob-5r 122

FOR WHOM
J. V. Winchell

CONTRACT NO. Nob 51 57200

TEST NO SIGN OF HOURS ON TEST

TEMPERATURE

VOLTAGE 1200 VDC

पोतों की

Clock #	/	335	Date finished
1	/	335	10/1/19
2	/	335	10/1/19
3	/	335	10/1/19
4	/	335	10/1/19
5	/	335	10/1/19
6	/	335	10/1/19
7	/	335	10/1/19
8	/	335	10/1/19
9	/	335	10/1/19
10	/	335	10/1/19
11	/	335	10/1/19
12	/	335	10/1/19
13	/	335	10/1/19
14	/	335	10/1/19
15	/	335	10/1/19
16	/	335	10/1/19
17	/	335	10/1/19
18	/	335	10/1/19
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20	/	335	10/1/19
21	/	335	10/1/19
22	/	335	10/1/19
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25	/	335	10/1/19
26	/	335	10/1/19
27	/	335	10/1/19
28	/	335	10/1/19
29	/	335	10/1/19
30	/	335	10/1/19
31	/	335	10/1/19
32	/	335	10/1/19
33	/	335	10/1/19
34	/	335	10/1/19
35	/	335	10/1/19
36	/	335	10/1/19
37	/	335	10/1/19
38	/	335	10/1/19
39	/	335	10/1/19
40	/	335	10/1/19
41	/	335	10/1/19
42	/	335	10/1/19
43	/	335	10/1/19
44	/	335	10/1/19
45	/	335	10/1/19
46	/	335	10/1/19
47	/	335	10/1/19
48	/	335	10/1/19
49	/	335	10/1/19
50	/	335	10/1/19
51	/	335	10/1/19
52	/	335	10/1/19
53	/	335	10/1/19
54	/	335	10/1/19
55	/	335	10/1/19
56	/	335	10/1/19
57	/	335	10/1/19
58	/	335	10/1/19
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62	/	335	10/1/19
63	/	335	10/1/19
64	/	335	10/1/19
65	/	335	10/1/19
66	/	335	10/1/19
67	/	335	10/1/19
68	/	335	10/1/19
69	/	335	10/1/19
70	/	335	10/1/19
71	/	335	10/1/19
72	/	335	10/1/19
73	/	335	10/1/19
74	/	335	10/1/19
75	/	335	10/1/19
76	/	335	10/1/19
77	/	335	10/1/19
78	/	335	10/1/19
79	/	335	10/1/19
80	/	335	10/1/19
81	/	335	10/1/19
82	/	335	10/1/19
83	/	335	10/1/19
84	/	335	10/1/19
85	/	335	10/1/19
86	/	335	10/1/19
87	/	335	10/1/19
88	/	335	10/1/19
89	/	335	10/1/19
90	/	335	10/1/19
91	/	335	10/1/19
92	/	335	10/1/19
93	/	335	10/1/19
94	/	335	10/1/19
95			

Clock # 13 - 1407

72

Total Hours	72
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ELECTRICAL TESTS BEFORE LIFT TEST

[illegible]

ELECTRICAL TESTS AFTER LIFT TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt T.F. - Major 11F						> 100K		100K		100K	100K	100K			100K		100K/100K			100K	100K				100K
Lay out 1-102	915	936	956	975	967	977		927		866	912	936			862		936	941	874		856	938	980		991
Pow. 1-102 %	36	33	42	38	45	42		.43		.31	.39	.41			.58		.35	.40	.33		.93	.36	.31		.38

Page 24

Date collected by

HT. VW-H7

ENCLOSURE NO. 1002 C.L. 1002

2002 WINSTON-SALEM CORPORATION

WOMEN. WAS

NObsr #	Voltage	Temp.	Number of Units	Failed Before Life	Started on Life	Mechanical Failures	Mylar Failures	% Mylar Failures	Lot Material	Margin	Pre-gauged Material	Number Open After Life
93	1000 D.C.	85°C	25	3	22	0	1	4.5%	#2	1/4"	Yes	0
94	1100 D.C.	85°C	25	5	20	0	0	0%	#2	1/4"	Yes	0
95	1200 D.C.	85°C	25	0	25	0	3	12%	#2	1/4"	Yes	0
96	1300 D.C.	85°C	25	1	24	0	1	4.16%	#2	1/4"	Yes	0
97	1400 D.C.	85°C	25	0	25	0	3	12%	#2	1/4"	Yes	0
98	1500 D.C.	85°C	25	1	24	1	0	0%	#2	1/4"	Yes	0
99	1600 D.C.	85°C	25	1	24	4	2	10.5%	#2	1/4"	Yes	1
100	1700 D.C.	85°C	25	4	21	2	3	15.8%	#2	1/4"	Yes	0
101	1800 D.C.	85°C	25	2	23	3	5	25%	#2	1/4"	Yes	0
102	1900 D.C.	85°C	25	2	23	3	3	15%	#2	1/4"	Yes	0
103	2000 D.C.	85°C	25	4	21	1	5	25%	#2	1/4"	Yes	0
104	2100 D.C.	85°C	25	2	23	3	3	15.8%	#2	1/4"	Yes	1
105	2000 D.C.	85°C	25	2	23	0	6	26%	#2	1/4"	Yes	0
106	2100 D.C.	85°C	25	2	23	1	4	18.2%	#2	1/4"	Yes	0
107	2200 D.C.	85°C	25	2	23	2	6	30%	#2	1/4"	Yes	1
108	2200 D.C.	85°C	25	3	23	1	4	19%	#2	1/4"	Yes	1
109	2300 D.C.	85°C	25	1	24	2	4	20%	#2	1/4"	Yes	2
110	2400 D.C.	85°C	25	0	25	0	8	33.3%	#2	1/4"	Yes	1
111	2300 D.C.	85°C	25	0	25	0	19	79%	#2	1/4"	Yes	1
112	2400 D.C.	85°C	25	0	25	0	10	45.5%	#2	1/4"	Yes	3
113	2500 D.C.	85°C	25	0	25	0	8	33.3%	#2	1/4"	Yes	1
114	2300 D.C.	85°C	25	2	23	0	8	36.4%	#2	1/4"	Yes	1
115	2400 D.C.	85°C	25	1	24	0	9	43%	#2	1/4"	Yes	3
116	2500 D.C.	85°C	25	1	24	0	12	57%	#2	1/4"	Yes	3
117	2100 D.C.	85°C	25	0	25	0	16	66.6%	#2	1/4"	Yes	1
118	2200 D.C.	85°C	25	1	24	3	7	33.3%	#2 & 3	1/4"	Yes	0
119	2300 D.C.	85°C	25	6	19	0	5	29.4%	#2 & 3	1/4"	Yes	2
120	2000 D.C.	85°C	25	7	18	1	5	29.5%	#2 & 3	1/4"	Yes	0
121	2100 D.C.	85°C	25	5	20	1	4	21%	#2 & 3	1/4"	Yes	0
122	2200 D.C.	85°C	25	2	23	0	4	18%	#2 & 3	1/4"	Yes	1

LIFE TEST RECORD

25 UNITS .25 ufd - single .5 MIL. Metallized Mylar Capacitors
SPECIFICATION

HOURS ON TEST	TEMPERATURE	VOLTAGE
2.50	85° C	600 VDC
Date started	Date finished	
6. Aug 4. 1953	19 August 1953	
	Clock # 1 - 3509 Tray #	Clock # 1 - 3795 Tray #
		Total Hours 2.86

ELECTRICAL TESTS BEFORE LIFE TEST

[illegible]

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shuttle No. 27100K/101				JACK																	100K				
on 47" VMEC																					100K				
Cap. in Mts - 100K/250				273	267	256	260	258	260	261	258	257	245	270	261	254		263	261		253	252	264	252	256
Power Factor %				4.8	3.2	3.7	3.7	3.6	4.3	1.2	3.0	3.8	9.6	1.15	4.2	4.2		3.9	3.6		3.7	3.6	6.5	5.4	3.6

Page 26

ENGINEERING DEPT. C.L. 1002

TOBE DEUTSCHMANN CORPORATION

Data collected by H.J. - V.W.

WORWOOD, MASS

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 26

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units

The units were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C. for one half hour. The capacitance was measured at 85 C. The units were then exposed to 600 v.d.c., pre-breakdown test for one half hour, after which the capacitance was again measured. During this period, there were 9 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	6.2 mfd.	Start of Test
66	5.95 mfd.	19 hours
67	6.4 mfd.	26 hours
70	6.3 mfd.	90 hours
72	6.1 mfd.	112 hours
79	- - -	118 hours
80	6.2 mfd	137 hours
80	6.1 mfd.	157 hours
80	6.1 mfd.	182 hours
82	6.1 mfd.	233 hours
83	6.25 mfd.	264 hours
83	6.25 mfd.	286 hours

Test completed

NObsr M No. 26 (Continued)

Number of units started on test-----	25
Number finished-----	22
Total capacitance before life test at room temperature-----	6.2
Total capacitance before life test at 85 C.-----	6.2
Total capacitance after pre-breakdown test-----	6.2
Total capacitance after Life Test-----	6.25
Number of permanent failures-----	0
Number of temporary failures-----	83
Number of opens at the end of the test-----	3

LIFE TEST RECORD

25 UNITS .25 Mfd. - single .5 MIL - Metallized Mylar Capacitors LOT NO. Nebser M 22
 SPECIFICATION 1 FOR WHOM V. Winroth CONTRACT NO. Nebser 57200

HOURS ON TEST 250 TEMPERATURE 85°C VOLTAGE 700 VDC
 Date started Clock # 2. 3384 Date finished Clock # 2 - 3669
 6 August 1953 18 August 1953 Total Hours 285

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 700 DC	P																	P	P	P	P	P	P	P	P
Shunt R. Mega. 21K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K																									
Cap. in Mfd. - 1000%	253	255	259	260	266	264	263	254	263	264	252	261	263	276	258	269	255	266	266	270	260	276	266	270	271
Power Factor - %	34	47	31	14	35	30	29	41	42	39	33	35	36	37	31	50	32	38	50	50	5	38	50	118	49
LIFE TEST FAILURES IN HRS.																									

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mega. 21K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K 50K																									
Cap. in Mfd. - 1000%	253	255	266	268	261	256	261	252	261	261	251	260	253	271	257	266	258	262			254	273			
Power Factor - %	37	44	40	10	32	34	25	42	38	39	33	38	41	70	35	57	43	39			31	40			
LIFE TEST FAILURES IN HRS.																									

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 27

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units.

The units were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85C. for one-half hour. The capacitance was measured at 85C. The units were then exposed to 700 v. d. c. pre-breakdown test for one-half hour, after which the capacitance was again measured. During this period, there were 68 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	6.1 mfd.	Start of Test
73	5.75 mfd.	19 hours
87	---	26 hours
112	5.85 mfd.	91 hours
121	---	113 hours
137	---	118 hours
137	5.6 mfd.	137 hours
140	---	157 hours
140	---	182 hours
149	5.55 mfd.	237 hours
153	5.65 mfd.	264 hours
153	5.65 mfd.	285 hours

Test completed

NObsr M No. 27 (Continued)

Number of units started on test-----	23
Number finished -----	21
Total capacitance before life test at room temperature-----	6.3 mfd.
Total capacitance before life test at 85 C. -----	6.3
Total capacitance after pre-breakdown test-----	6.1
Total capacitance after Life Test-----	5.65
Number of permanent failures-----	0
Number of temporary failures-----	153
Number of opens at the end of the test-----	2

25 UNITS . 25 yfd - single, 5 mil - Metallized Mylar Copoaitors LOT NO. Nobsr M 28
SPECIFICATION FOR WHOM V. Winrotb CONTRACT NO. Nobsr 57200

SPECIFICATION

TEST NO SUCH HOURS ON TEST

Date started

Total Hours 285

Tray

DATE RECEIVED
August

3-2257

2

DATE STAMPED

1

ELECTRICAL TESTS BEFORE LIFE TEST

7

1

1

[illegible]

ELECTRICAL TESTS AFTER LIFE TEST

[illegible]

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mega-ohm														25K/100K			100K								100K
on 415 V. meter																									
Cap. in mfd - 1000	26.256	264	257	260	253	263	260	254	265	264	253	256	257	272	257		213	259	237	254	240	230	258	241	190
Power Factor - %	55	64	60	55	65	49	1.0	1.85	1.17	1.35	1.51	1.85		1.75	1.64		1.67	49	72	87	1.25	49	41	64	54

Page 325

1

HOUGHTON 1972. C.Y. 1002

DONWOOD, NASS

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 28

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units.

The units were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C. for one half hour. The capacitance was measured at 85 C. The units were then exposed to 800 v.d.c. pre-breakdown test for one half hour, after which the capacitance was again measured. During this period, there were 67 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	6.5 mfd.	Start of Test
64	6.22 mfd.	18 hours
64	---	25 hours
89	6.25 mfd.	39 hours
97	---	112 hours
100	---	118 hours
100	---	136 hours
100	---	157 hours
103	---	182 hours
103	6.1 mfd	237 hours
104	6.1 mfd	264 hours
104	6.15 mfd.	285 hours

Test completed

Nobsr M No. 28 (continued)

Number of units started on test-----	25
Number finished-----	23
Total capacitance before life test at room temperature-----	6.5 mfd.
Total capacitance before life test at 85 C.-----	6.65
Total capacitance after pre-breakdown test-----	6.5
Total capacitance after Life Test-----	6.15
Number of permanent failures-----	0
Number of temporary failures-----	104
Number of opens at the end of the test-----	2

LIFE TEST RECORD

25 UNITS 2.5 μ fd. Single 5 MIL - Metallized Mylar Capacitors LOT NO. Nabster M 29
 SPECIFICATION FOR WHOM V. Winreth CONTRACT NO. Nabster 57200

HOURS ON TEST 250 TEMPERATURE 85° C VOLTAGE 900 VDC
 Date started 17 August 1953 Clock # 4-2040 Date finished 29 August 1953 Clock # 4-2302 Total Hours 262

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 900 DC	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Shunt R. Mega-ohm	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
on 475 V. Meter	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267	267
Cap. in μ fd.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Power Factor - %	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
LIFE TEST FAILURES IN HRS.	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mega-ohm	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
on 475 V. Meter	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
Cap. in μ fd.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Power Factor - %	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 29

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units.

The units (19) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C for one half hour. The capacitance was measured at 85 C. The units were then exposed to 900 v.d.c. pre-breakdown test for one half hour, after which the capacitance was again measured. During this period, there were 28 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	5.3 mfd.	Start of Test
62	5.18	20 hours
73	5.10	41 hours
128	5.0	64 hours
130	4.98	88 hours
144	4.95	113 hours
146	5.0	159 hours
149	5.0	169 hours
150	5.0	193 hours
154	4.9	216 hours
155	5.0	240 hours
161	4.95	262 hours

Test completed

NObsr M No. 29 (Continued)

Number of units started on test-----	19
Number finished-----	17
Total capacitance before life test at room temperature-----	5.05
Total capacitance before life test at 85 C. -----	5.3
Total capacitance after pre-breakdown test-----	5.3
Total capacitance after Life Test-----	4.95
Number of permanent failures-----	0
Number of temporary failures-----	161
Number of opens at the end of the test-----	2

LIFE TEST RECORD

25 UNITS 25 Mfd. - Single .5 MIL - Metallized Mylar Capacitors LOT NO. Nobsr M 30
 SPECIFICATION FOR VERN V. Winroth CONTRACT NO. Nobsr 57200

HOURS ON TEST 250 TEMPERATURE 85°C VOLTAGE 1000 VDC
 Date started 17 August 1953 Clock # 5-1867 Date finished 29 August 1953 Clock # 5-2130 Total Hours 263

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Volts - 1000 DC	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Shunt R. Meas. - 90°F on 475 V. Meter	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in Mfd. - 1000	254	272	259	270	268	268	264	260	256	256	261	258	258	270	265	264	252	259	265	254					
Power Factor - %	1.7	1.37	1.34	1.45	1.38	1.38	1.3	1.42	1.38	1.38	1.36	1.32	1.32	1.58	1.70	3.2	3.35	1.60	1.4	1.35					
LIFE TEST FAILURES IN HRS.	open				unable to locate source of the failure		Both pigtails loosened away from the section	open		open						open		Pre-life Test	open		unable to locate the source of the failure	Mechanical failure - opened metal penetrated core of section			

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. - Mega. 90°F	100K	100K	100K	100K		100K		100K	100K	100K	100K	100K	1.5K	100K	100K	100K	100K			100K				100K	
on 475 V. Meter								Loosened away from the section		Ground Pigtail Loosened							.240	Top of section skuffed to the end of the section	Ground Pigtail Loosened	.227					
Cap. in Mfd. - 1000	.257	.246	.246	.264		.169		.260	.36		.250	.250	.255	.250	.262					.30				.258	
Power Factor - %	.30	.35	1.02	1.02		1.08		1.36		Ground Pigtail Loosened	.39	2.0	1.2	3.2	.54		.29							.34	
	Both pigtails Loosened away from the section							Loosened away from the section		Ground Pigtail Loosened									Ground Pigtail Loosened						
																								</	

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 30

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units.

The units (20) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C. for one half hour. The capacitance was measured at 85 C. The units were then exposed to 1000 v.d.c. pre-breakdown test for one half hour, after which the capacitance was again measured. During this period, there were 120 temporary breakdowns. No. 18 failed completely after 32 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	4.00 mfd.	Start of Test
275	3.85	20 hours
289	3.80	41 hours
290	3.62	64 hours
290	3.60	88 hours
290	3.57	113 hours
291	3.57	159 hours
294	3.62	169 hours
295	3.65	193 hours
295	3.65	213 hours
342	3.55	240 hours
342	3.50	263 hours

Test completed

NObsr M No. 30 (Continued)

Number of units started on test-----	19
Number finished-----	13
Total capacitance before life test at room temperature-----	5.3
Total capacitance before life test at 85 C.-----	5.55
Total capacitance after pre-breakdown test-----	4.00
Total capacitance after Life Test-----	3.50
Number of permanent failures-----	1
Number of temporary failures-----	342
Number of opens at the end of the test-----	6

LIFE TEST RECORD

25 UNITS 25 Mfd - Single - .5 MIL - Metallized Mylar Capacitors LOT NO. Nobsr M³¹
 SPECIFICATION FOR VOM V. Winroth CONTRACT NO. Nobsr 57200

HOURS ON TEST 250 TEMPERATURE 85°C VOLTAGE 1100 VDC
 Date started Clock # 6 - 1600 Date finished Clock # 6 - 1860 Total Hours 260
 17 August 1953 29 August 1953

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1100 DC	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Shunt R Mega-ohm	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in Mfd - 1000	200	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260
Power Factor - %	3.1	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
LIFE TEST FAILURES IN HRS.	17																								

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R Mega-ohm	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in Mfd - 1000	200	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260	260
Power Factor - %	3.1	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 31

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units

The units (19) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C. for one half hour. The capacitance was measured at 85 C. The units were then exposed to 1100 v.d.c. pre-breakdown test for one half hour, after which the capacitance was again measured. During this period, there were 203 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	3.94 mfd.	Start of Test
280	---	17 hours Unit No. 1 failed
280	2.32	17 hours
287	3.08	38 hours
293	2.81	61 hours
297	2.79	85 hours
301	2.79	110 hours
307	3.05	156 hours
309	3.00	166 hours
309	2.90	190 hours
311	3.05	213 hours
312	3.07	237 hours
313	3.07	260 hours

Test completed

NObsr M No. 31 (Continued)

Number of units started on test-----	19
Number finished-----	11
Total capacitance before life test at room temperature-----	4.75
Total capacitance before life test at 85 C.-----	5.25
Total capacitance after pre-breakdown test-----	3.94
Total capacitance after Life Test-----	3.07
Number of permanent failures-----	1
Number of temporary failures-----	313
Number of opens at the end of the test-----	7

LIFE TEST RECORD

25 UNITS 25 Mfd. single-.5 MIL - Metallized Mylex Capacitors LOT NO. Nobsr M-32
 SPECIFICATION Experimental FOR VERN Wiroth CONTRACT NO. Nobsr 57200
 HOURS ON TEST 250 TEMPERATURE 85 C VOLTAGE 1200 VDC
 Date started Clock # 1-3798 Date finished Clock # 1-4054
 28 August 1953 11 September 1953 Total Hours 256

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage-1200 DC	P.K															P			P.K						P
Shunt R Mega-ohm	3K	100K	10K	30	100K	100K	30K	30K	100K	100K	30K	40K	3.5K	20K	25K	20K			50K	45	100K	3K	40K	100K	100K
in 475 V. meter																									
Cap. in Mfd. 100%	268	263	267	268	261	264	264	290	259	264	260	259	255	263	256	259			265	265	266	266	279	263	255
Power Factor - %	44	37	35	26	33	39	84	30	38	37	39	29	39	76	39	35			38	75	1.6	1.0	50	33	38
LIFE TEST FAILURES IN HRS.	Open			Pre Life Test			Open				Open	Open	Open	Open	Open	Open	Open	Open		Pre Life Test	Open	Open	Pre Life Test	Open	
																		</							

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mega-ohm on 475 V. Meter	100K	100K	100K	100K	100K	100K	100K	3K	100K	100K	100K	100K	100K	100K	100K	100K	100K	100K	35K	100K	100K	100K	100K	100K	75K
Cap. in Mfd. 100%	230	230	230	235	235	259	263	241	259	263	241	259	263	241	259	263	241	259	137	245	245	245	245	245	249
Power Factor - %	44	44	44	43	43	69	30	52	41	30	52	41	30	52	41	30	52	41	52	2.15	2.15	2.15	2.15	2.15	68
	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Milior Failure. AT Point Water Mould holds the film.			Both pistols loosened away from the section.													Milior Failure. AT the can where mould holds the film.					
	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	Pistol to the can loosened away from the section	

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 32

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units

The units (23) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C for one half hour. The capacitance was measured at 85 C. The units were then exposed to 1200 v.d.c. pre-breakdown test for one half hour. Unit No. 20 failed completely after 7 temporary breakdowns, unit No. 4 after 10 and Unit No. 23 after 100 temporary breakdowns. The capacitance was again measured before the Life Test commenced. During this breakdown period, there were 449 temporary failures.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	3.70 mfd.	Start of Test
39	3.4	0 hours
331	3.12	22 hours
349	3.12	43 hours
355	3.12	67 hours
372	2.90	91 hours
403	2.38	163 hours
407	2.38	210 hours
408	2.50	234 hours
416	2.35	256 hours

Test completed

NObsr M No. 32 (Continued)

Number of units started on test-----	20
Number finished-----	10
Total capacitance before life test at room temperature-----	5.45
Total capacitance before life test at 85 C-----	5.55
Total capacitance after pre-breakdown test-----	3.70
Total capacitance after Life Test-----	2.35
Number of permanent failures-----	0
Number of temporary failures-----	416
Number of opens at the end of the test-----	10

LIFE TEST RECORD

25 UNITS .25 Hfd. - Single - .5 Mil - Metallized Mylar Capacitors LOT NO. Nobsr M 33

SPECIFICATION Experimental FOR VOM V. Winrothe CONTRACT NO. Nobsr 57200

HOURS ON TEST 250 TEMPERATURE 85° C VOLTAGE 1300 VDC

Date started Clock # 2 - 3671 Date finished Clock # 2 - 3923

28 August 1953 Tray # 9 September 1953 Total Hours 252

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1300 DC	P	P		P		P	P	P		Terminaling from the section.	P	Terminaling from the section	P												P
Shunt R. Megohms	20K	2K		15K		15K	15K	30K		Ground pig tail broken away from the section.	50K	Terminaling from the section	25K	40K	15K	5K	20K	20K	30K	25K	100K	4K	30K	5K	30K
on 475 V Meter																									
Cap. in Hfd. 1000	200	200		200		200	200	200			230	Terminaling from the section	259	259	266	253	262	266	253	263	259	266	263	264	253
Power Factor %	44	50		18		35	91	51		Grounding the section	48	Terminaling from the section	39	35	34	41	36	36	39	32	36	42	31	42	44
LIFE TEST FAILURES IN HRS.	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Pre Life Test	Open	67	Open	Open	Open	Open	Pre Life Test	Open	Open	Open	Open		67	Open

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Megohm	Both contacts loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	Both pigtails loosened away from the section	
on 475 v meter																									
Cap in Hfd. 1000 %																									
Power Factor %																									

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 33

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units.

The units (20) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C for one half hour. The capacitance was measured at 85 C. The units were then exposed to 1300 v.d.c. pre-breakdown test for one half hour. Unit No. 18 failed completely after 194 temporary breakdowns, and Unit No. 11 after 316 self-healing breakdowns. The capacitance was again measured before the Life Test commenced. During this breakdown period, there were 316 temporary failures.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	4.37 mfd.	Start of Test
349	3.78	67 hours Unit No. 24 failed completely after 349 temporary break- downs.
392	---	Unit No. 13 failed completely after 392 temporary break- downs.
872	.55	88 hours
886	.55	111 hours
939	---	111 hours Unit No. 8 failed completely after 939 temporary break- downs.
999	.125	134 hours
1009	.125	158 hours
1022	.250	225 hours
1025	.120	247 hours

NObsr M No. 33 (Continued)

TEMPORARY BREAKDOWNS

TOTAL CAPACITANCE

ELAPSED TIME

1028

.130 mfd.

252 hours

Test completed

Number of units started on test-----	18
Number finished-----	1
Total capacitance before Life Test at room temperature-----	5.2
Total capacitance before Life Test at 85 C.-----	5.4
Total capacitance after pre-breakdown test-----	4.37
Total capacitance after Life Test-----	.13
Number of permanent failures-----	3
Number of temporary failures -----	1028
Number of opens at the end of the test-----	14

LIFE TEST RECORD

UNITS			LOT NO.	
25	25-4fd.	SING/E - .5 MIL - METALLIZED MYLAR CAPACITORS	LOT NO.	Nebst M ⁿ 34

SPECIFICATION	FOR WHOM	CONTRACT NO.
Experimental	V. Winzeth	Nabscr 57200

TEST NO.	TEST DATE	TEST TIME	TEST TYPE	TEST RESULT	TESTER	TEST LOCATION	TEST COMMENTS
1	10/10/2010	14:00	TEMPERATURE	75°C			
2	10/10/2010	14:00	VOLTAGE	1400 VDC			

[illegible]

DATE	TIME	LOCATION	REMARKS
28 August 1953	TRAY #	12 September 1953	TRAY #

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 1400V	P	P	P		P														P		P	P	P		P
Shunt R 1K, 2K, 3K, 4K, 5K	30K	40K	25K		50K	40K	45K	15K	30K	30K	25K	4K	20K	50K	15K	45K	40K	30K	30K		3K	10K	15K		30K
on 475 V meter																									
Cop. In wfd 1000%	254	252	258		271	269	267	270	260	262	259	264	265	263	257	253	263	268	256		258	266	263		259
Power Factor %	38	78	30		34	55	24	30	40	34	32	32	1.3	38	30	3.8	67	38	35		10	34	85		35
LIFE TEST FAILURES IN HRS.	Open	1	1	Terminal Pigtail Broken away from the section	Open	Open	1	Open	Free Life Test	Open	Pre Life Test	Open	Open	Open	Open	Open	Open	Open		Mylar Failure at the start of the winding	Open	Open	Open	Terminal Pigtail Broken away from the section	

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt to Mega. 75F	Pistol to the Can Loosened away from the section	Several Mylar Failures. First 12 inches of the section	Several Mylar Failures. First 12 inches of the section	Both pig tails loosened away from the section.	Pistol to the Can Loosened away from the section.	Pistol to the Can Loosened away from the section.	Mylar Failure. First two inches of the section.	Both pig tails loosened away from the section.	Many Mylar Failures. Outer end and inner 15 of the section	Pistol to the Can Loosened away from the section.	Mylar Failures. Outer end and inner 15 of the section	Both pig tails loosened away from the section.	Pistol to the Can Loosened away from the section.	Pistol to the Can Loosened away from the section.	Pistol to the Can Loosened away from the section.	Pistol to the Can Loosened away from the section.	Both pig tails loosened away from the section.	Both pig tails loosened away from the section.	Pistol to the Can Loosened away from the section.	Pistol to the Can Loosened away from the section.	Loosened away from the section	Both pig tails loosened away from the section	Both pig tails loosened away from the section	Both pig tails loosened away from the section	
20 415 V Meter																			8K						15K
Cap. In. 4 ft. 1000%																			1152						50.
Power Factor - %																			50.						50.

Data collected by H.J. VW.

NUMBER OF TEMPORARY BREAKDOWNS VS TIME

NObsr M No. 34

Twenty-five .25 mfd. single
metalized Mylar C Units.

The units (22) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C for one half hour. The capacitance was measured at 85 C. The units were then exposed to 1400 v.d.c. pre-breakdown test for one half hour. Unit No. 9 failed completely after 108 temporary breakdowns. Unit No. 9 failed completely after 108 temporary breakdowns, Unit No. 11 after 449 self-healing breakdowns. The capacitance was again measured before the Life Test commenced. During this breakdown period, there were 449 temporary failures.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	3.55 mfd	Start of Test
393	2.2	1 hour
446	---	1 hour Unit No. 3 failed completely.
453	---	1 hour Unit No. 7 failed completely.
632	---	1 hour Unit No. 2 failed completely.
752	.95	22 hours
830	.55	45 hours
895	.60	69 hours
996	.55	93 hours
1062	.55	159 hours
1108	.275	182 hours
1114	.275	206 hours

NObsr M No. 34 (Continued)

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
1121	.275 mfd.	228 hours
1233	.160	252 hours

Test completed

Number of units started on test -----	20
Number finished-----	2
Total capacitance before Life Test at room temperature-----	5.50
Total capacitance before Life Test at 85 C.-----	5.75
Total capacitance after pre-breakdown test-----	3.55
Total capacitance after Life Test-----	.160
Number of permanent failures-----	3
Number of temporary failures-----	1233
Number of opens at the end of the test-----	15

LIFE TEST RECORD

25 UNITS 25 4fd. - single 5 MIL - Metallized, Mylar Capacitors. LOT NO. Nobsr M 35

SPECIFICATION Experimental FOR VEHOM V. Winroth CONTRACT NO. Nobsr 37200

HOURS ON TEST 250 TEMPERATURE 85° C VOLTAGE 800 KDC
 Date started Clock # 4-2304 Date finished Clock # 4-2559 Total Hours 255
 3 September 1953 17 September 1953

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage 800VDC			P	P	P		P				P			P				P		P				P	
Shunt P. Meter			100K 100K 100K			100K					100K			100K 100K 100K			40K 10K			100K				100K	
Cap. in 4fd 1000%			257 263 263			261 272 256 262 262								264 263 275 262 262			261 261 265 273 259 254			261 261 265 273 259 254					
Power Factor %			30 70 32			25 50 25 20 29								32 30 38 30 25			47 21 22 29 27 26			47 21 22 29 27 26					
LIFE TEST FAILURES IN HRS.																									

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt P. Meter			100K 100K 100K			100K					100K			100K 100K 100K			2K 100K			100K				100K	
Cap. in 4fd 1000%			255 257 258			255 269 254 255 259								256 253 271 213 237			258 237 259 269 256 250			258 237 259 269 256 250					
Power Factor %			38 53 44			37 63 39 47 51								62 44 98 15 50			53 41 26 38 36 42			53 41 26 38 36 42					

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 35

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units

The units (19) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C for one half hour. The capacitance was measured at 85 C. The units were then exposed to 800 v.d.c. pre-breakdown test for one half hour, after which the capacitance was again measured. During this period, there were 42 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	5.2 mfd.	Start of Test
31	5.2	18 hours
56	5.0	84 hours
56	5.0	107 hours
57	5.0	130 hours
58	5.0	153 hours
59	5.0	177 hours
68	5.0	181 hours
96	5.0	204 hours
100	5.0	229 hours
100	5.0	255 hours

Test completed

NObsr M No. 35 (Continued)

Number of units started on test-----	19
Number finished-----	19
Total capacitance before life test at room temperature-----	5.0
Total capacitance before life test at 85 C. -----	5.2
Total capacitance after pre-breakdown test-----	5.2
Total capacitance after Life Test-----	5.0
Number of permanent failures-----	0
Number of temporary failures-----	100
Number of opens at the end of the test-----	0

LIFE TEST RECORD

25 UNITS - 25 yfd - single - .5 MIL - Metallized Mylar Capacitors

SPECIFICATION	FOR VEON	CONTRACT NO.
Experimental	V. Winroth	No 65r 57200

HOURS ON TEST	TEMPERATURE	VOLTAGE
250	85°C	900 VDC

Date started	Clock #	Date finished	Clock #
	5-2131		5-2383
			5-2383

Tray #	Tray #	Total hours
September 1953	17 September 1953	232

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage - 900 DC	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Shunt R Mfg. 89F 100K on 475 V Meter				100K		15K 100K	100K	20K 100K	100K 100K	100K 100K			100K		100K		100K	5K 80K			100K 100K 50K 100K				
Cap. 11 mfd. 100V 261	.256	.260	.250			.272	.259	.260	.267	.259	.250		.260		.258	.263	.255	.259	.262	.269		.262	.262	.277	.263
Power Factor - .90	.34	.42	.25	.30		.30	.26	.30	1.9	.29	.31		.44		.23	.34	.37	.48	1.8	.25		.26	1.4	.42	1.4
LIFE TEST FAILURES IN HRS.					Terminal Pigtail broken away from the section.							ground pigtail broken away from the pigtail	Mylar failure at every strand of section at the bonding								BATH pigtails broken away from the section				open

ELECTRICAL TESTS AFTER LIFT TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R Megs. 77°F on 475 V Meter	100K			100K			100K	100K	100K	100K	100K	100K	100K		100K		100K	100K	100K	100K	100K	100K	100K	50K	100K
Cap. in 475 V. 100K	220	253	250	229			238		254	199	243	252			210	157	259	254	257			255	259	244	253
Power Factor. %	39	48	66	49			44		1.6	43	36	42			45	46	46	61	2.2			35	1.7	66	1.75

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 36

Twenty-five .25 mfd. single
.5 mil Metallized Mylar C Units.

The units (21) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C for one half hour. The capacitance was measured at 85 C. The units were then exposed to 900 v. d. c. pre-breakdown test for one half hour, after which the capacitance was again measured. During this period, there were 74 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	5.35 mfd.	Start of Test
94	5.10	18 hours
248	4.80	84 hours
281	4.75	107 hours
282	4.65	131 hours
284	4.55	153 hours
286	4.43	177 hours
291	4.70	181 hours
296	4.70	204 hours
301	4.70	239 hours
309	4.70	252 hours

Test completed

Number of units started on test-----	21
Number finished-----	18
Total capacitance before life test at room temperature-----	5.55
Total capacitance before life test at 85 C. -----	5.7
Total capacitance after pre-breakdown test-----	5.35
Total capacitance after Life Test-----	4.70
Number of permanent failures-----	0
Number of temporary failures-----	309
Number of opens at the end of the test-----	3

LIFE TEST RECORD

25 UNITS	25 yfd - single .5 mil - Metallized Mylar Capacitors	LOT NO.	NO. 57 M TH 37
SPECIFICATION	Experimental	CONTRACT NO.	NO. 57 200
HOURS ON TEST	250	TEMPERATURE	25°C
Date started	3 September 1953	VOLTAGE	1000 VDC
		Clock #	6 - 2110
		Tray #	
		Date finished	17 September 1953
		Total Hours	250

ELECTRICAL TESTS BEFORE LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Voltage-100VDC	P											P	ground broken down from The section	P	P	P	terminal pitail break array from The section	P							P
Shunt R/Magn. 91F 5K	100K 50K	5K	40K	100K	100K	6K	25K	100K	7K																
on 415 V Meter																									
Cap. in 4/d. 1000 μ	201	200	204	259	258	262	266	259	263	261	267	259		270	267	260		248	259	265	259	263	253	260	256
Power Factor	52	30	34	90	25	26	74	34	54	1.5	3.5	25		1.3	51	29		29	29	25	94	53	32	30	3.4
LIFE TEST FAILURES IN HOURS	42			open			open		18	open		open	size ground broken down from The section	open	open	open	used terminal pitail array from The section					open			open

ELECTRICAL TESTS AFTER LIFE TEST

Sample Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Shunt R. Mega-ohm on 475 V. Meter	100K 50K	100K 50K	1.5K 100K		1.5K 100K	100K		100K			100K					100K	100K	100K	100K	100K	100K	100K	100K	100K	100K
Cap. in Mfd. 1000 1/2	159	253			242	245		161			256					250		239	251	255	233		242	215	
Power Factor - %	66	40			1.4	55		43			12					55		39	64	51	16		57	59	

Page 59

ENGINEERING DEPT. C.L. 1002

SONI DEFENCEMAN CORPORATION

Data collected by H.T. - Y.W.

BORWOOD, MASS

NUMBER OF TEMPORARY BREAKDOWNS VS. TIME

NObsr M No. 37

Twenty-five .25 mfd. single
.5 mil metallized Mylar C units.

The units (23) were wired to a life test rack and the total capacitance measured at room temperature. Following this, they were heated in an oven to 85 C for one half hour. The capacitance was measured at 85 C. The units were then exposed to 1000 v.d.c. pre-breakdown test for one half hour, after which the capacitance was again measured. During this period, there were 32 temporary breakdowns.

<u>TEMPORARY BREAKDOWNS</u>	<u>TOTAL CAPACITANCE</u>	<u>ELAPSED TIME</u>
0	5.2 mfd.	Start of Test
174	---	18 hours Unit No. 9 failed completely.
190	4.6	18 hours
389	---	22 hours Unit No. 1 failed completely
460	3.5	82 hours
460	3.5	105 hours
476	3.7	129 hours
481	3.1	151 hours
484	3.55	175 hours
488	3.45	179 hours
490	3.45	202 hours
491	3.30	227 hours
492	3.38	250 hours

Test completed

NObsr M No. 37 (Continued)

Number of units started on test-----	23
Number finished-----	13
Total capacitance before life test at room temperature-----	6.1
Total capacitance before life test at 85 C. -----	6.3
Total capacitance after pre-breakdown test-----	5.2
Total capacitance after Life Test-----	3.38
Number of permanent failures -----	2
Number of temporary failures-----	492
Number of opens at the end of the test-----	8

.25 Mfd. single .0005" Metallized Mylar

Test	Temperature	Voltage	Number Started On Test	Number Finished On Test	Life Test Failures	Temporary Breakdowns	Opens After Life Test	Capacitance Before Life Test	Capacitance After Life Test
NObar M#26	85°C	600 VDC	25	22	0	83	3	6.2 Mfd.	6.25 Mfd.
" M#27	85°C	700 VDC	23	21	0	153	2	6.1 "	5.65 "
" M#28	85°C	800 VDC	25	23	0	104	2	6.5 "	6.15 "
" M#29	85°C	900 VDC	19	17	0	161	2	5.3 "	4.95 "
" M#30	85°C	1000 VDC	19	13	0	342	6	4.0 "	3.50 "
" M#31	85°C	1100 VDC	19	11	1	313	7	3.94 "	3.07 "
" M#32	85°C	1200 VDC	20	10	0	416	10	3.70 "	2.35 "
" M#33	85°C	1300 VDC	18	1	3	1028	14	4.47 "	.13 "
" M#34	85°C	1400 VDC	20	2	3	1233	15	3.55 "	.16 "
" M#35	85°C	800 VDC	19	19	0	100	0	5.2 "	5.0 "
" M#36	85°C	900 VDC	21	18	0	300	3	5.35 "	4.7 "
" M#37	85°C	1000 VDC	23	13	2	492	8	5.2 "	3.38 "

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